ASRTU SPECIFICATION FOR PATCHES FOR TYRES AND INNER TUBES FOR TYRES

0.0 SPECIFICATION NO. : AS:164:59:JUL:99

1.0 SCOPE :

1.1 This standard prescribes requirements & method of testing for Patches for Tyres and Inner Tubes for Tyres.

1.2 This is a purchase specification and does not include manufacturing details. The parts/material supplied against this specification shall be compatible with the original equipment.

1.3 The supplier shall provide detail drawings and specifications to the purchasing/ inspecting authority whenever such information is specifically called for.

1.4 The material offered against this specification shall conform to this specification in full. The tests shall be carried out on the part directly or on the specimen prepared from the components'.If any of the samples fail in any one or more tests specified, the sample shall be considered as not having met the requirements of this specification.

1.5 It is the manufacturer's prime responsibility to satisfy the inspection authority that the commodity conforms to this standard. This may be accomplished by performing the tests specified in this standard.

1.6 Sample selection shall be the responsibility of the Quality Assurance Officer. Required quality for complete testing as per this specification shall be supplied.

1.7 This specification supersedes earlier specifications including AS:164:55:AUG:97.

2.0 APPLICATION & REFERENCE :

2.1 This specification covers the requirements of patches required for repairing pneumatic tyre & tube inner for tyre.

2.2 It customary that Patches and Vulcanising Fluid used are of the same manufacturer.

2.3 The following Indian Standards are necessary adjuncts to this standard.

	Specification No.	Year	Title
1	3400 (Part 1) (IInd Revision)	1987	Methods of test for vulcanised rubber Tensile stress/strain properties
2	3400 (Part 17)	1974	Tear strength angular test piece.
3	ASTMD 1084	1981	Standard Test Methods for Viscosity of Adhesives.

3.0 TERMINOLOGY :

3.1. **Precured Tyre Patch**
This is a cured rubber assembly reinforced with rubber coated fabric plies as per specific requirements. For vulcanisation with tyre, this cured assembly is provided with a specially formulated face gum (a chemical unvulcanised integral layer) which is protected by polyethylene or metalised film.

3.1.1 **Cold Bonding** :
Vulcanisation at room temperature is initiated by treating this bottom unvulcanised layer of the patch with specially prepared chemical vulcanising fluid/ solution. The prepared inner surface of tyre must also be treated with chemical vulcanising cement for effective cold bonding.

3.1.2 **Hot or Precure Process :**
When using these patches while retreading, the inside of the tyre shall be treated with Black Vulcanising Cement whereas the patch has to be given a coat of Chemical vulcanising cement.

3.2 **Precured Patch for Tube Repairs** :
A cured patch laminated with a chemical cushion gum protected by a Polyethylene Film. **OR**

A cured patch with a chemical unvulcanised layer integral at the bottom protected by a metal foil or metallised film.

3.3 **Chemical Vulcanising Cement** :
This is a specially formulated rubber based cement which is used with precure chemical patches to facilitate cold Bonding with Tyre or Tube.

3.4 **Cleaning Solvent :**
It is an organic solvent used for dissolving dirt and grime, especially rubber dust. It also acts as cleaning solvent for better adhesion of patch to be used after buffing / brushing and before application of vulcanising cement and the patch.

3.5 **Black Vulcanising Cement :**
Black Vulcanising Cement is a material which is applied on the buffed carcass prior to application of precured patch. This acts as a bonding media between the patch & the carcass &/or cushion. A base stock with Natural Rubber & other required chemicals/ingradients is made & mixed with rubber solvent in a cement mixing churn. The resultant solution should have uniform viscosity & required total solid content (TSC).

4.0 REQUIREMENTS :

4.1 **Appearance :**
The patch shall be free from wrinkles kinks, and air trappings.

4.1.1 **Application :**
The patches are to be classified as per the use on cross ply tyres, radial tyres and tubes and also as per the suitability of on the various injury sizes.

4.1.2 **Dimensions :**
Every manufacturer shall recommend the specific size of the patch for specific size of injury.

4.1.3 10 numbers shall be drawn for testing of each type.

4.2 **Black Vulcanising Cement :**
The cement shall have uniform brushable consistency, free from lumps of undissloved rubber and sedimentation. 10 litres sample shall be drawn for testing.

4.3 **Type of Material for Tyre Patch :**
Reinforcement material shall be Nylon (Bias) or Polyester (Radial) of a suitable denier and EPI warpsheet and square woven (small patches) to give reinforcement to the tyre injury and flex in operation.

CORD STRENGTH . 8 Kgs. (IS:4910 Part - II), Min.

4.4 **Physical Properties :**
The physical properties of all material namely, patches and Vulcanising Cement shall conform to the secification laid down in Table - 1.

5.0 SHELF LIFE :

5.1 All material shall render satisfactory performance and shall meet the physical property requirement specified as given in Table 1 when tested within 6 months for Face Gum Patch, 12 months for chemical patch , and 6 months for vulcanising fluid / cement from the date of supplies. The material shall be transported and stored as indicated below :-

a) Material shall be protected from any physical damage during transit.

b) Area of storage shall preferably be cool and dry.

6.0 SUPPLY CONDITIONS :

6.1 **Marking** :
Each patch shall be marked with the following :

	For Tube Patch	**For Tyre Patch**
a)	Manufacturer's Trade Mark	a) Manufacturer's Trade Mark b) Type of Patch & its size c) Arrow indicating the directon of fitment.
b)	Size	

6.2 **Packing** :
Material shall be suitably packed in Card board boxes or poly bags to withstand transit and storage handling.

Patches : 10 Nos. in each box or as agreed upon.

Vulcanising Cement :
Collapsible aluminium tubes (for small quantity) or in 1 litre capacity tin or as agreed upon.

6.3 The packed containers/tins shall be labelled /printed with the following.

a) Trade Mark,
b) Quantity,
c) Size of Patch & its application
d) Month and Year of Manufacturing,
e) Expiry date
f) Name of the manufacturer,
g) Maximum retail price.

TABLE - 1
PHYSICAL PROPERTIES FOR PATCHES

Sr. No.	Properties	Requirements	Testing Method IS:3400
1.	Appearance	The material shall be free from dirty moulding, blisters, air traps and kinks	
2.	Dimensions Max.	As agreed upon between the manufacturer and purchaser	
A)	**Tyre Patches**		
a)	Angle Tear (Kgf/cm), Min.	7	IS:3400 (Pt. 17):1974
b)	Peeling Strength between patch and substrat, Min.	5 Kgf per 25 mm	Appendix A
B)	**Tube Patches**		
a)	Tube repair patches shall be tested using inflator device for debonding and gripping of the patch on the substrat. The loss of gripping by black part shall not be more than 1% in 8 hours duration.		
C)	**Chemical Vulcanising Fluid**		
1)	Appearance	The fluid shall have uniform consistency, free from lumps of undissolved rubber & sedimentation.	
2)	Viscosity	1200 to 2000 Cps	ASTMD 1084
3)	Cured Pull Test Adhesion, Min.	5 Kgf per 25mm	Appendix A

Note: 1) Tests at Sl. No. A (a) is only to be carried out where minimum required surface is available.

2) Tests at Sl. No. A (b), B(a) and c(3) shall be carried out after 24 hrs. of application for Chemical Patches Cured at room temperature & for heat cure patches, after attaining the room temperature.

3) The quality of patches and chemical vulcanising fluid shall not be tested in the absence of either, being complimentary to each other.

APPENDIX `A'

PROCEDURE FOR CURNING & PREPARING SPECIMEN FOR ADHESION TEST

1.0 ROOM TEMPERATURE CURE :

1.1 Take a piece of strong cured rubber sheet of about 15 mm thickness or preferably a piece of rubberised conveyor belting of equivalent size of the patch.

1.2 Gently buff the surface with a 32 grit carbide rasp to produce a fresh rubber surface with a texture similar to the RMA 2 standard.

1.3 Clean the buffed surface thoroughly with a solvent and allow the solvent to dry.

1.4 Apply the Chemical Vulcanising Cement on the buffed surface and allow it to dry for 10 or 15 minutes.

1.5 Peel the backing from the patch specimen and apply one even coat of Chemical Vulcanising Cement and alow it to dry for 10 or 15 minutes.

1.6 Place the release paper covering half of the cemented rubber piece as shown in fig 2.

1.7 Place the cemented patch on top of this as shown in fig 3 and press well without trapping air.

1.8 Place a small weight of about 5 kg on the assembly to ensure proper contact.

1.9 Allow the assembly to cure undisturbed for about 24 hours or as per the manufacturer's recommendation, whichever is less.

1.10 After curing cut the assembly in strips of 25 mm width as shown in fig 3.

1.11 Clamp the specimen between the fixed and the moving jaws of a tensile tester as shown in fig 4 and peel the specimen apart at a speed of 50mm per minute.

1.12 Note the peaks of force required for peeling while the specimen is being pulled. It may be necessary to make small nicks with a sharp knife to facilitate peeling along the bond surface.

1.13 Since the strips are of 25 mm width the values obtained are in kgf/25 mm. The value of the lowest peak should not be less than 5 kgf/25mm.

2.0 HEAT CURE :

2.1 Prepare the specimen following steps 1.1 to 1.8 in the Room Temperature Cure test above.

2.2 Place the assembly in a specifically designed diaphragm press or in an autoclave with proper protection.

2.3 In the press, temperature should be maintained at 100 ±1C. The pressure in the diaphragm should be 3 kg/cm & the cure time as per the manufacturer's recommendation.

2.4 In the autoclave the specimen should be cured at 100 C and 3 kg/cm pressure hot air for a period specified by the manufacturer (Steam should not be used as the temperature of steam is more than 140 C at 3 kg/cm pressure).

2.5 After curing the test specimen to adhesion as in steps 1.11 to 1.13 Observation : The breaking of adhesion shall be such that, if takes out the surface of the substract instead of breaking the bond.

WEIGHTAGE MARKS FOR PATCHES FOR TYRES & INNER TUBES FOR TYRES AS:164:59:JUL:99

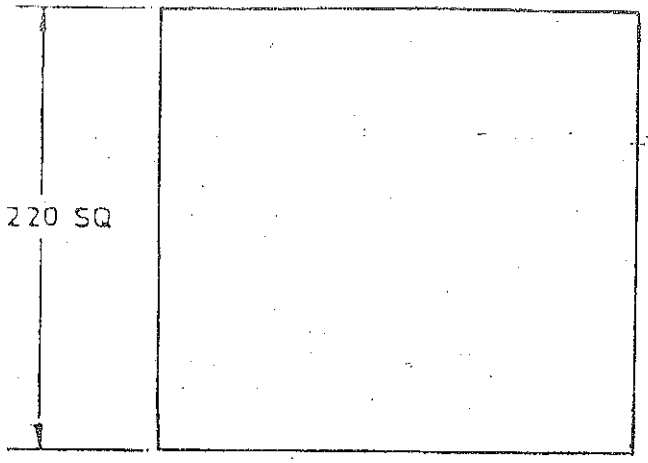
Sr.No.	Properties	Marks Allotted			P/T
		Vulcanising Fluid	Patches		
			Tyre	Tube	
1.	Appearance	10	10	10	T
2.	Dimensions	-	10	30	P
3.	Angle Tear	-	20	-	P
4.	Inflator Device Debonding	-	-	60	T
5.	Peeling Strength/Cured Pull Test Adhesion	60	60	-	P
6.	Viscosity	30	-	-	P
		100	100	100	

P = Proportionate marks shall be considered.
T = Total marks shall be considered.

jp.6h/99

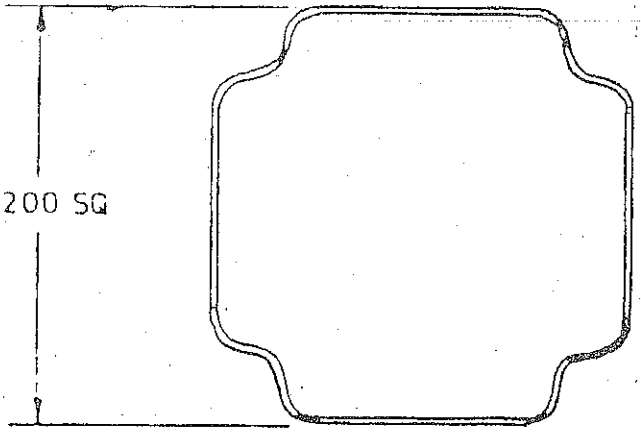
CONVEYOR BELTING PIECE OR RUBBER SLAB OF 15 mm APPROXIMATELY

Buff, clean and apply chemical cement on test rubber surface

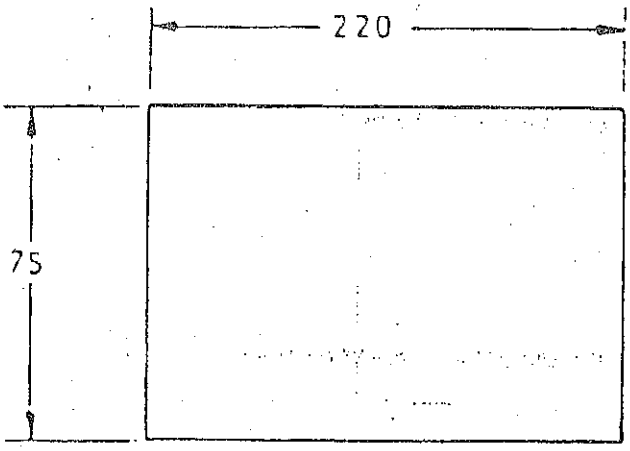


PATCH SPECIMEN

Peel poly backing off patch and apply chemical cement



DOUBLE SIDE COATED RELEASE PAPER



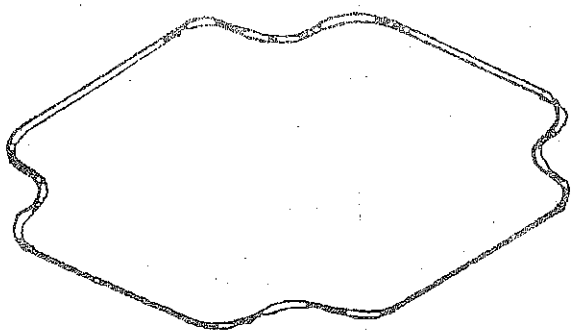
All dimensions in mm

FIG 1 COMPONENTS FOR ADHESION TEST

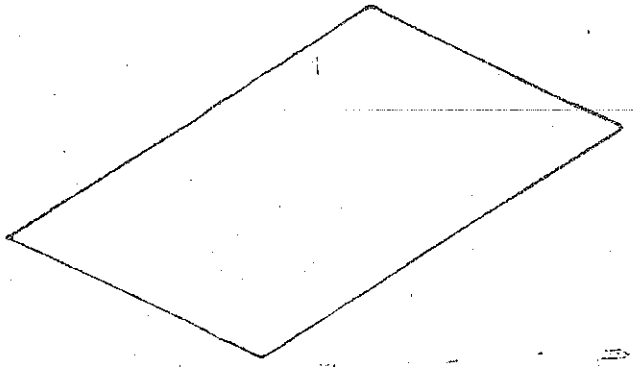
MASTER COPY

1054

PATCH



RELEASE PAPER



RUBBER SLAB

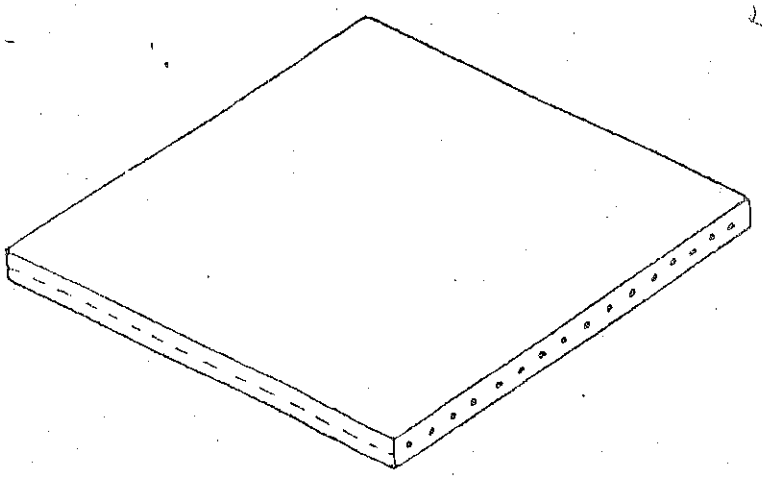
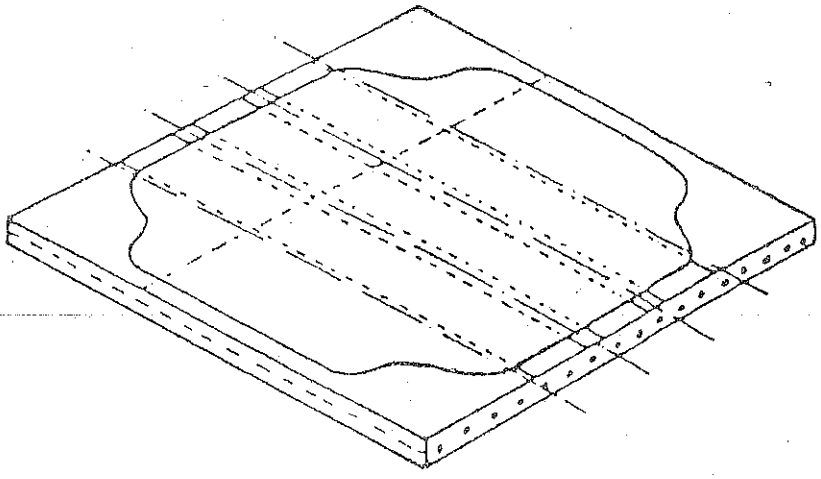


FIG 2 ASSEMBLY OF THE UNITS



After curing, cut along
chaindotted lines
to have 3 specimens

FIG 3 PREPARATION FOR PEEL TEST

AS: 164